Claims:

1. A light scattering detector device, comprising:

a detection cell to accept particles suspended in a gas stream and permit a polarized beam to pass through a trajectory of the particles and gas stream;

a sample light detector disposed to detect light scattered in the detection cell; and

a light trap that accepts the polarized beam after it passes through the detection cell, the light trap including,

an elongated housing through which the polarized beam passes, and light absorptive material within the elongated housing; and

an absorptive filter disposed to substantially align the electric field vector of the polarized beam with the plane of incidence defined by the polarized beam and the normal to said absorptive filter, and disposed to intersect the polarized beam at an angle of incidence that approximates Brewster's angle.

2. The device of claim 1, further comprising a light source to produce the polarized beam;

wherein the light source comprises a polarized laser having a power of at least 5 mW.

3. The device of claim 1, further comprising a light source to produce the polarized beam;

wherein the light source comprises an incoherent source with a polarizer.

4. The device of claim 1, further comprising:

a reference light detector to detect light passing through said absorptive filter; and

a noise cancellation circuit to sum a reference signal corresponding to light received by said reference light detector and a sample signal corresponding to light received by said sample light detector, the noise cancellation circuit further comprising one or more potentiometers that may be adjusted to balance said reference signal and said sample signal.

5. The device of claim 4, wherein said reference signal comprises a current output by said reference light detector, said sample signal comprises a current output by said sample light detector and current subtraction is conducted at a summing point in said noise cancellation circuit.

6. The device of claim 4, wherein said reference signal comprises a voltage proportional to a current output by said reference light detector, and said sample signal comprises a voltage proportional to a current output by said sample light detector, and voltage subtraction is conducted by a difference amplifier in said noise cancellation circuit.

7. The device of claim 4, further comprising a sample compound lens collector to direct light scattered in the detection cell upon the sample light detector.

8. The device of claim 7, wherein said sample compound lens collector comprises two aspheric lenses.

9. The device of claim 7, further comprising a spherical mirror to direct light scattered in the detection cell to the sample compound lens collector.

10. The device of claim 1, further comprising a sample compound lens collector to direct light scattered in the detection cell upon the sample light detector.

11. The device of claim 10, wherein said sample compound lens collector comprises two aspheric lenses.

12. The device of claim 10, further comprising a spherical mirror to direct light scattered in the detection cell to the compound lens collector.

13. The device of claim 12, further comprising:

a reference cell through which the polarized beam passes before the polarized beam is accepted by said light trap;

a reference light detector;

a reference cell compound lens collector to direct light scattered in the reference cell upon the reference light detector;

a spherical mirror to direct light scattered in the reference cell to the reference cell compound lens collector.

14. The device of claim 13, further comprising a light source to produce the polarized beam; and

a set of apertures disposed between said light source and said detection cell.

15. The device of claim 10, further comprising:

a reference cell through which the polarized beam passes before the polarized beam is accepted by said light trap;

a reference light detector; and

a reference cell compound lens collector to direct light scattered in the reference cell upon the reference light detector.

16. The device of claim 15, further comprising:

an inlet port that extends into said detection cell to control the trajectory of the particles and gas stream; and

an exit port that extends into said detection cell to control the trajectory of the particles and gas stream.

17. The device of claim 1, further comprising:

an inlet port that extends into said detection cell to control the trajectory of the particles and gas stream; and

an exit port that extends into said detection cell to control the trajectory of the particles and gas stream.

18. The device of claim 17, further comprising means to heat said inlet port and said exit port, wherein said detection cell is thermally isolated from said exit port and said inlet port.

19. The device of claim 18, wherein said detection cell is thermally nonconductive so that it is thermally isolated from said exit port and said inlet port.

20. The device of claim 18, wherein said detection cell is insulated from said exit port and said inlet port so that it is thermally isolated from said exit port and said inlet port.

21. The device of claim 1, wherein said absorptive filter comprises an absorptive neutral density filter.

22. The device of claim 1, wherein said absorptive filter comprises an absorptive band pass filter having a pass band set to mismatch the band of the polarized beam.

23. The device of claim 1, wherein the electric field vector and the plane of incidence defined by the polarized beam and the normal to said absorptive filter align within 2° or less.

24. The device of claim 23, wherein the electric field vector and the plane of incidence defined by the polarized beam and the normal to said absorptive filter align within 1° or less.

25. A light scattering detector device, comprising:

a detection cell to accept particles suspended in a gas stream and permit a light beam to pass through a trajectory of the particles and gas stream;

a sample light detector disposed to detect light scattered in the detection cell;

a light trap that accepts the light beam after it passes through the detection cell;

a sample compound lens collector to direct light scattered in the detection cell upon the sample light detector; and

a spherical mirror to direct light scattered in the detection cell to the compound lens collector.

26. The device of claim 25, further comprising:

a reference cell through which the light beam passes before the light beam is accepted by said light trap;

a reference light detector;

a reference cell compound lens collector to direct light scattered in the reference cell upon the reference light detector; and

a spherical mirror to direct light scattered in the reference cell to the reference cell compound lens collector.

27. The device of claim 26, further comprising a noise cancellation circuit to sum a reference signal corresponding to light received by said reference light detector and a sample signal corresponding to light received by said sample light detector, the noise cancellation circuit further comprising one or more potentiometers that may be adjusted to balance said reference signal and said sample signal.

28. The device of claim 27, wherein said reference signal comprises a current output by said reference light detector, said sample signal comprises a current output by said sample light detector and current subtraction is conducted at a summing point in said noise cancellation circuit.

29. The device of claim 27, wherein said reference signal comprises a voltage proportional to a current output by said reference light detector, and said sample signal comprises a voltage proportional to a current output by said sample light detector, and voltage subtraction is conducted by a difference amplifier in said noise cancellation circuit.

30. The device of claim 27, further comprising:

an inlet port that extends into said detection cell to control the trajectory of the particles and gas stream; and

an exit port that extends into said detection cell to control the trajectory of the particles and gas stream.

31. The device of claim 27, further comprising means to heat said inlet port and said exit port, wherein said detection cell is thermally isolated from said exit port and said inlet port.

32. The device of claim 31, wherein said detection cell is thermally nonconductive so that it is thermally isolated from said exit port and said inlet port.

33. The device of claim 31, wherein said detection cell is insulated from said exit port and said inlet port so that it is thermally isolated from said exit port and said inlet port.

34. The device of claim 25, further comprising:

an inlet port that extends into said detection cell to control the trajectory of the particles and gas stream; and

an exit port that extends into said detection cell to control the trajectory of the particles and gas stream.

35. A light scattering detector device, comprising:

a detection cell to accept particles suspended in a gas stream and permit a light beam to pass through a trajectory of the particles and gas stream;

a sample light detector disposed to detect light scattered in the detection cell;

a light trap that accepts the light beam after it passes through the detection cell;

a heated inlet port that extends into said detection cell to control the trajectory of the particles and gas stream; and

a heated exit port that extends into said detection cell to control the trajectory of the particles and gas stream.

36. The light scattering detector device of claim 35, comprising a first heater to heat said heated inlet port and a second heater to heat said heated exit port.

37. The light scattering detector device of claim 36, wherein said heated inlet port and said heated exit port are thermally conductive and said detection cell is thermally nonconductive.

38. The light scattering detector device of claim 35, wherein said heated inlet port and said heated exit port are thermally isolated from said detection cell.